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ABSTRACT

Children three through six years of age were asked to imitate actions depicted in photographs to determine whether they could interpret information of action in photographs. Twenty children at each of four age levels, 3, 4, 5, and 6 years, were asked to imitate two photos, each showing a young child performing a physical action. Following this task, the children were asked to imitate a live model performing the same actions for purposes of comparison. Finally, subjects were asked to describe what they saw in the pictures. Results indicated that children significantly improve in their ability to imitate actions depicted in photographs as they grow older (from mean of .36 at age 3 to 1.86 at age 6 based on a maximum score of 2). There were no significant increases with age in scores for imitating the live model which were high to start with at 3 years of age. Accurate verbal identification of actions in the photographs was achieved by 52% of the 3-year-olds, compared to 94% of the 6-year-olds. (Author/SS)

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Children's Comprehension of Actions Depicted in Photographs

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An important aspect of picture perception concerns the relationship between a picture and what it depicts. The nature of this relationship has received its most thorough psychological examination from J.J. Gibson who explains the perception of pictures by the direct pick-up of corresponding informational invariants in the two-dimensional representation and its three-dimensional real world referent. The accounts of very young children's ability to recognize the information contained in pictures without instruction or even prior exposure lends credence to such an explanation. There are, contrariwise, philosophic and aesthetic accounts of pictorial representation which argue that the ability to process pictorial information derives from an understanding of conventional ways of depicting reality. In these views creating and comprehending pictorial images requires knowledge and application of specific symbolic codes. As an example, E.H. Gombrich proposes that the comprehension of pictorial images, including photographs, which appear to have a particularly direct link with reality, requires the participation of what he calls the "beholder's share", referring to the perceiver's interpretation of pictorial information. A not too dissimiliar view is expressed by Nelson Goodman. Despite a fair amount of discussion of the important issues inherent in these differing interpretations little research has been directed to an examination of these issues.

The present study was designed to investigate one aspect of children's understanding of the representational nature of pictures. Children three through six years of age were asked to respond to specific information contained in a set of black and white photographs. They were asked to imitate actions depicted in these photographs as well as to imitate a live model who performed the same actions. The intent of the study was to determine whether children could intepret information of action in

photographs as directly as they could recognize objects in photographs and identify comparable action in the real world. The measure of their understanding was their physical imitations of the actions and verbal description of the perceived photographs.

The order of presentation of the two imitation tasks was counterbalanced. Following the two imitation tasks children were asked to describe each photograph to assess their ability to distinguish the salient features of the photographs and to examine some aspects of the role of linguistic representation in pictorial representation.

The eighty children who participated in this study were randomly selected from a middle class nursery and from the kindergarten and first grades of a surburban school. There were twenty children at each of four age levels: three, four, five and six years. Equal numbers of boys and girls were represented at each age.

Prior to the imitation tasks children were given a pretest requiring the naming of five common objects depicted in 5 black and white photographs. None of the children had difficulty identifying the objects depicted. The photograph imitation task consisted in presenting each child with twelve 8 in. x 10 in. black and white photographs showing a young child performing various actions. The actions were unfamiliar and unrelated to everyday activity, but were within the capabilities of the children studied. For example, one photograph showed a child standing on one foot with his hands on his hips, another showed a child with his hands held up in the air and his head lowered. The experimenter explained that he was going to show pictures of a child playing and the subject was to "do" what the child in the picture was doing. The child was also asked not to talk or describe the pictures during the procedure. Each photo-

graph was presented for 30 seconds or until the subject completed his imitation.

Instructions for imitating the live model were similar to those used in imitating the photographs. Prior to modeling each action the model instructed the subject to cover his eyes with his hands and not to look until told to do so. When the model was in position he told the subject to look and "do" what the model was doing.

Upon completion of the imitation tasks the subject was asked to describe what he saw in the pictures.

A mean verbal accuracy score based on correct identification of the object and actions in the photograph was computed for each subject for the 12 photographs. Scoring reliability between the experimenter and an independent observer for 50% of the data showed 95% agreement.

The photo and live model imitation task data in the form of mean judged correct imitations were subjected to a four-way repeated measures analysis of variance for Age, Sex, Order of Presentation and Task. The mean scores appear in table 1. The results revealed significant main effects for Age and Task, and significant interactions for Age with Task and Age with Presentation order, as well as a significant three-way interaction among Age, Task and Presentation order. The age data reveal that children significantly improve in their ability to imitate the actions depicted in photographs as they grow older (from a mean of .36 at age 3 to 1.86 at age 6 based on a maximum score of 2. Post hoc comparisons revealed that significant increases in photo imitation scores occurred between the ages of four and five, and between five and six years. There were no significant increases with age in scores for imitating the live model, which were high to start with at 3 years of age (3 year mean = 1.29; 6 year mean = 1.97).

Scores for imitating the live model were significantly higher than scores for imitating the photograph's model for all ages except 6 years when they were high for both (1.97 vs. 1.86).

A three-way analysis of variance for Age, Sex, and Order of Presentation for the verbal description accuracy scores indicated a significant effect only for Age (From a mean of 1.01 at 3 years to 1.84 at 6 years). Post hoc comparisons showed that the only significant increase with age occurred between four and five years.

The extent to which subjects could verbally identify actions and objects is reported in Table 2. The results of this analysis showed that only 52% of 3-year-old subjects identified actions in the photographs (action alone plus combined action and object) whereas 94% of the 6-year-olds did so. A major change in the proportions occurred between the 4- and 5-year-old groups which parallels the significant increases that occur in the photo imitation and verbal accuracy indices.

The imitation and verbal report data presented thus far indicate that children as old as three- and four-years-of-age have difficulty in extracting information of action from photographs, despite the very early ability to recognize objects in photographs, which apparently occurs in the first year of life, although paradoxically our 3-year-olds do not detail objects in photographs in great numbers.

Is this difficulty in responding to action information particular to photographs or is it characteristic of other representational media as well? To test this we asked a group of 3- to 5-year-old children to imitate actions depicted in line drawings and to imitate dolls posed in the middle of comparable actions. A preliminary analysis of these data shows both types of imitation are more successfully carried out than the imitation of photographic action, with the imitation of doll action approximating that of the

live model and imitation of line drawings somewhere between the photographs and the live models.

These studies suggest then that responding to the information in photographs involves different levels of complexity. The child's ability to recognize objects in photographs is only a first step in understanding the information contained in pictures, and actions, which entail a second order integration of information, are embodied in cues that are understood later in development.

What is there about photographs that makes them more difficult to process than other 2-dimensional representations. A number of possibilities suggest themselves. One derives from J.J. Gibson who suggests that photographs may contain too much information in contrast to line drawings or caricatures. The latter selectively represent, for the most part, only the critical information needed to identify the object, or in the present case, the cues to action. The greater reality of the photograph thus confuses the subject instead of enlightens him.

Another possibility refers to the limited experience of young children with photographs. Limited experience with cameras and with photographs that transform 3-dimensional cues to unfamiliar 2-dimensional cues may thus inhibit response to photographic information. Contrastingly, the 2-dimensional cues to objects in photographs may share more properties with 3-dimensional object cues than 2-dimensional action cues share with 3-dimensional cues to action. Another way of conceptualizing this relation, following Goodman and Gombrich, is to propose that the code, be it linguistic in some sense, or from some other symbol system, into which 3-dimensional information is transformed, has not been acquired by the young child.

The data of this study offer no priveledged evidence in favor of any one of these alternatives; they offer instead additional data in need of explanation.

G. Kose, H. Beilin & J. O'Connor Children's comprehension of actions depicted in photographs. Southeastern Conference of Human Development, Old Town Alexandria, April, 1980.

Table 1. Imitation scores for live model and photograph and verbal description accuracy scores (in means[a]).

Age Groups (years)	Imitation		Verbal Description
	Live Model	Photographs	Accuracy
3	1.29	.36	1.01
4	1.61	.67	1.02
5	1.83	1.18	1.75
6	1.97	1.86	1.84

[a] Maximum score = 2

Table 2. Verbal descriptions: Object and action descriptions (in percents[a])

Age Groups	Static Object Alone	Actions Alone	Objects Plus Actions	No Response
3	9	13	39	39
4	5	14	44	37
5	3	11	80	6
6	3	5	88	4

[a] based on 240 descriptions (20 Ss x 12 photographs) per age group